WHAT IS CLAIMED IS:

1.   An image processing apparatus comprising:

an image pickup device which has a structure in which a large number of primary photosensitive pixels having a narrower dynamic range and higher sensitivity

5   and a large number of secondary photosensitive pixels having a wider dynamic range and lower sensitivity are arranged in a given arrangement and image signals can be obtained from said primary photosensitive pixels and said secondary photosensitive pixels at one exposure;

an information storage which stores first image information obtained from said

10   primary photosensitive pixels and second image information obtained from said secondary photosensitive pixels;

a selection device for selecting whether or not said second image information is to be stored; and

a storage control device that controls storing of said first image information and

15   said second image information according to selection performed with said selection device.

2.   The image processing apparatus according to claim 1, wherein said first image information and said second image information are stored as two separate files associated with each other.

20 3.   The image processing apparatus according to claim 1, wherein said second image information is stored as difference data between said first image information and said second image information in a file separate from a file storing said first image information.

4.   The image processing apparatus according to claim 2, wherein said second

25 image information is stored as difference data between said first image information and said second image information in a file separate from a file storing said first image information.

5.   The image processing apparatus according to claim 1, wherein said second image information is compressed by compression technology different from compression technology used for said first image information and stored.

6.   The image processing apparatus according to claim 2, wherein said second image information is compressed by compression technology different from compression technology used for said first image information and stored.

7.   The image processing apparatus according to claim 3, wherein said second image information is compressed by compression technology different from compression technology used for said first image information and stored.

8.   The information processing apparatus according to claim 1, further comprising a D range information storage for storing dynamic range information for said second image information with at least one of said first image information and said second image information.

9.   The information processing apparatus according to claim 2, further comprising a D range information storage for storing dynamic range information for said second image information with at least one of said first image information and said second image information.

10.   The information processing apparatus according to claim 3, further comprising a D range information storage for storing dynamic range information for said second image information with at least one of said first image information and said second image information.

11.   The information processing apparatus according to claim 4, further comprising a D range information storage for storing dynamic range information for said second image information with at least one of said first image information and said second image information.

12.   The image processing apparatus according to claims 1 to 11, further comprising:

a D range setting operation device for specifying a dynamic range for said second image information; and

5   a D range changeable control device for changing a reproduction gamut for said second image information according to setting specified with said D range setting operation device.

13.   An image processing apparatus comprising:

an image pickup device which has a structure in which a large number of primary photosensitive pixels having a narrower dynamic range and higher sensitivity

10   and a large number of secondary photosensitive pixels having a wider dynamic range and lower sensitivity are arranged in a given arrangement and image signals can be obtained from said primary photosensitive pixels and said secondary photosensitive pixels at one exposure;

a first image signal processing device which generates first image information

15   according to signals obtained from said primary photosensitive pixels with the purpose of outputting an image by a first output device; and

a second image signal processing device which generates second image information according to signals obtained from said secondary photosensitive pixels with the purpose of outputting an image by a second output device different from said first

20   output device.

14.   The image processing apparatus according to claim 13, wherein said first image information is visually designed with the purpose of outputting onto an sRGB-based display.

15.   The image processing apparatus according to claim 13, wherein said second

25   image information is visually designed so as to have characteristics suitable for print output.

16.   The image processing apparatus according to claim 14, wherein said second image information is visually designed so as to have characteristics suitable for print output.

5   17.   The image processing apparatus according to claim 13, wherein said first image information and said second image information are stored in respectively different bit depths.

18.   The image processing apparatus according to claim 14, wherein said first image information and said second image information are stored in respectively different bit
10   depths.

19.   The image processing apparatus according to claim 15, wherein said first image information and said second image information are stored in respectively different bit depths.

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20.   The image processing apparatus according to claim 16, wherein said first image information and said second image information are stored in respectively different bit depths.

20   21.   The image processing apparatus according to claims 13 to 20, further comprising:

a reproduction gamut setting operation device for specifying a reproduction gamut for said second image information; and

a reproduction area changeable control device for changing the reproduction
25   gamut for said second image information according to a setting specified with said reproduction gamut setting operation device.

22.   An image processing apparatus comprising:

an image pickup device which has a structure in which a large number of
30   primary photosensitive pixels having a narrower dynamic range and higher sensitivity and a large number of secondary photosensitive pixels having a wider dynamic range and

lower sensitivity are arranged in a given arrangement and image signals can be obtained from said primary photosensitive pixels and said secondary photosensitive pixels at one exposure;

a storage control device which controls storing of first image information
5 obtained from said primary photosensitive pixels and said second image information obtained from said secondary photosensitive pixels;

a D range setting operation device for specifying a dynamic range for said second image information; and

a D range changeable control device which changes a reproduction luminance
10 gamut for said second image information according to a setting specified with said D range setting operation device.

23. An image processing apparatus comprising:

an image display device for displaying an image obtained by an image pickup device which has a structure in which a large number of primary photosensitive pixels
15 having a narrower dynamic range and higher sensitivity and a large number of secondary photosensitive pixels having a wider dynamic range and lower sensitivity are arranged in a given arrangement and image signals can be obtained from said primary photosensitive pixels and said secondary photosensitive pixels at one exposure; and

a display control device for switching between first image information obtained
20 from said primary photosensitive pixels and second image information obtained from said secondary photosensitive pixels to cause said image display device to display said first or second image information.

24. An image processing apparatus comprising:

an image display device for displaying an image obtained by an image pickup
25 device which has a structure in which a large number of primary photosensitive pixels having a narrower dynamic range and higher sensitivity and a large number of secondary photosensitive pixels having a wider dynamic range and lower sensitivity are arranged in a given arrangement and image signals can be obtained from said primary photosensitive pixels and said secondary photosensitive pixels at one exposure; and

a display control device which causes said image display device to display first image information obtained from said primary photosensitive pixels and highlight an image portion the reproduction gamut of which is extended by said second image information with respect to the reproduction gamut of said first image information, on

5 the display screen of said first image information.

25. The image processing apparatus according to claims 1 to 11, 13 to 20, and 22 to 24, wherein said image pickup device has a structure in which each photoreceptor cell is divided into a plurality of photoreceptor regions including at least said primary photosensitive pixel and said secondary photosensitive pixel, a color filter of the same

10 color component is disposed over each photoreceptor cell for said primary photosensitive pixel and said secondary photosensitive pixel in the photoreceptor cell, and one micro-lens is provided for each photoreceptor cell.

26. An image processing method comprising:

an image pickup step of capturing an image of a subject by an image pickup

15 device which has a structure in which a large number of primary photosensitive pixels having a narrower dynamic range and higher sensitivity and a large number of secondary photosensitive pixels having a wider dynamic range and lower sensitivity are arranged in a given arrangement and image signals can be obtained from said primary photosensitive pixels and said secondary photosensitive pixels at one exposure;

20 an information storing step of storing first image information obtained from said primary photosensitive pixels and second image information obtained from said secondary photosensitive pixels;

the selection step of selecting whether or not said second image information is to be stored; and

25 a storage control step of controlling storing of said first image information and said second image information according to said selection.

27. An image processing method comprising:

an image pickup step of capturing an image of a subject by an image pickup device which has a structure in which a large number of primary photosensitive pixels

having a narrower dynamic range and higher sensitivity and a large number of secondary photosensitive pixels having a wider dynamic range and lower sensitivity are arranged in a given arrangement and image signals can be obtained from said primary photosensitive pixels and said secondary photosensitive pixels at one exposure;

5 a first image signal processing step of generating first image information according to signals obtained from said primary photosensitive pixels with the purpose of outputting an image by a first output device; and

a second image signal processing step of generating second image information according to signals obtained from said secondary photosensitive pixels with the purpose

10 of outputting an image by a second output device different from said first output device.

28. An image processing method comprising:

an image pickup step of capturing an image of a subject by an image pickup device which has a structure in which a large number of primary photosensitive pixels having a narrower dynamic range and higher sensitivity and a large number of secondary

15 photosensitive pixels having a wider dynamic range and lower sensitivity are arranged in a given arrangement and image signals can be obtained from said primary photosensitive pixels and said secondary photosensitive pixels at one exposure;

a storage control step of controlling storing of first image information obtained from said primary photosensitive pixels and said second image information obtained

20 from said secondary photosensitive pixels;

a D range setting operation step of specifying a dynamic range for said second image information; and

a D range changeable control step of changing a reproduction luminance gamut for said second image information according to a setting specified at said D range setting

25 operation step.

29. An image processing method comprising:

an image display step of displaying on an image display device an image obtained by an image pickup device which has a structure in which a large number of primary photosensitive pixels having a narrower dynamic range and higher sensitivity

30 and a large number of secondary photosensitive pixels having a wider dynamic range and

lower sensitivity are arranged in a given arrangement and image signals can be obtained from said primary photosensitive pixels and said secondary photosensitive pixels at one exposure; and

5   a display control step of switching between first image information obtained from said primary photosensitive pixels and second image information obtained from said secondary photosensitive pixels to cause said image display device to display said first or second image information.

30.   An image processing method comprising:

an image display step of displaying on an image display device an image
10   obtained by an image pickup device which has a structure in which a large number of primary photosensitive pixels having a narrower dynamic range and higher sensitivity and a large number of secondary photosensitive pixels having a wider dynamic range and lower sensitivity are arranged in a given arrangement and image signals can be obtained from said primary photosensitive pixels and said secondary photosensitive pixels at one
15   exposure; and

a display control step of causing said image display device to display first image information obtained from said primary photosensitive pixels and highlight an image portion the reproduction gamut of which is extended by said second image information with respect to the reproduction gamut of said first image information, on a display
20   screen for said first image information.

31.   An image processing program that causes a computer to implement:

an image pickup function of capturing an image by using an image pickup device which has a structure in which a large number of primary photosensitive pixels having a narrower dynamic range and higher sensitivity and a large number of secondary
25   photosensitive pixels having a wider dynamic range and lower sensitivity are arranged in a given arrangement and image signals can be obtained from said primary photosensitive pixels and said secondary photosensitive pixels at one exposure;

an information storing function of storing first image information obtained from said primary photosensitive pixels and second image information obtained from said
30   secondary photosensitive pixels;

the selection step of selecting whether or not said second image information is to be stored; and

a storage control function of controlling storing of said first image information and said second image information according to said selection.

5   32.   An image processing program that causes a computer to implement:

an image pickup function of capturing an image by using an image pickup device which has a structure in which a large number of primary photosensitive pixels having a narrower dynamic range and higher sensitivity and a large number of secondary photosensitive pixels having a wider dynamic range and lower sensitivity are arranged in

10   a given arrangement and image signals can be obtained from said primary photosensitive pixels and said secondary photosensitive pixels at one exposure;

a first image signal processing function of generating first image information according to signals obtained from said primary photosensitive pixels with the purpose of outputting an image by a first output device; and

15   a second image signal processing function of generating second image information according to signals obtained from said secondary photosensitive pixels with the purpose of outputting an image by a second output device different from said first output device.

20   33.   An image processing program that causes a computer to implement:

an image pickup function of capturing an image by using an image pickup device which has a structure in which a large number of primary photosensitive pixels having a narrower dynamic range and higher sensitivity and a large number of secondary photosensitive pixels having a wider dynamic range and lower sensitivity are arranged in

25   a given arrangement and image signals can be obtained from said primary photosensitive pixels and said secondary photosensitive pixels at one exposure;

a storage control function of controlling storing of first image information obtained from said primary photosensitive pixels and said second image information obtained from said secondary photosensitive pixels;

30   a D range setting operation function of specifying a dynamic range for said second image information; and

a D range changeable control function of changing a reproduction luminance gamut for said second image information according to a setting specified with said D range setting operation function.

34.   An image processing program that causes a computer to implement:

an image display function of displaying on an image display device an image obtained by an image pickup device which has a structure in which a large number of primary photosensitive pixels having a narrower dynamic range and higher sensitivity and a large number of secondary photosensitive pixels having a wider dynamic range and lower sensitivity are arranged in a given arrangement and image signals can be obtained from said primary photosensitive pixels and said secondary photosensitive pixels at one exposure; and

a display control function of switching between first image information obtained from said primary photosensitive pixels and second image information obtained from said secondary photosensitive pixels to cause said image display device to display said first or second image information.

35.   An image processing program that causes a computer to implement:

an image display function of displaying on an image display device an image obtained by an image pickup device which has a structure in which a large number of primary photosensitive pixels having a narrower dynamic range and higher sensitivity and a large number of secondary photosensitive pixels having a wider dynamic range and lower sensitivity are arranged in a given arrangement and image signals can be obtained from said primary photosensitive pixels and said secondary photosensitive pixels at one exposure; and

a display control function of causing said image display device to display first image information obtained from said primary photosensitive pixels and highlight an image portion the reproduction gamut of which is extended by said second image information with respect to the reproduction gamut of said first image information, on a display screen for said first image information.